

# Electrostatic and Electrochemical Optimization of Electrospray Thrusters

Completed Technology Project (2012 - 2015)



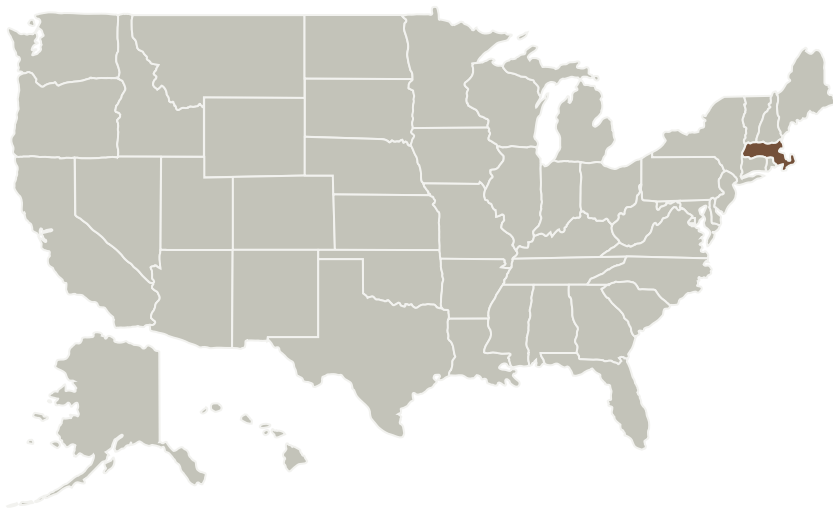
## Project Introduction

Interest in small-satellite missions has grown recently, however there has been no propulsion technology capable of scaling down to meet mission needs. Electrospray thrusters have this scalability in thrust, size, and mass, but achieving increased electrospray thrust density requires micro- and nano-scale component engineering. Recent work has produced thrusters operating at promising levels for near-future small-satellite missions. Improvements in performance must occur at the level of the propellant emission sites where physical properties can be optimized for specific mission requirements. An integrated model of electrospray emission for prediction of propulsive performance will be developed and tested. With a working model, various combinations of thruster properties can be examined to determine configurations which lead to desired performance regimes. Additionally, the application of electrospray thrusters to example mission architectures (station-keeping, orbital transfer, long-duration operation, etc.) will be investigated to determine the impact development in this area will have upon future space exploration.

## Anticipated Benefits

Interest in small-satellite missions has grown recently, however there has been no propulsion technology capable of scaling down to meet mission needs. Electrospray thrusters have this scalability in thrust, size, and mass, but achieving increased electrospray thrust density requires micro- and nano-scale component engineering. An integrated model of electrospray emission for prediction of propulsive performance will be developed and tested.

## Primary U.S. Work Locations and Key Partners



Project Image Electrostatic and Electrochemical Optimization of Electrospray Thrusters

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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Responsible Program:

Space Technology Research Grants

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## Primary U.S. Work Locations

Massachusetts

## Images



**11532-1363184064670.jpg**

Project Image Electrostatic and Electrochemical Optimization of Electrospray Thrusters  
(<https://techport.nasa.gov/image/1763>)

## Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

## Project Management

### Program Director:

Claudia M Meyer

### Program Manager:

Hung D Nguyen

### Principal Investigator:

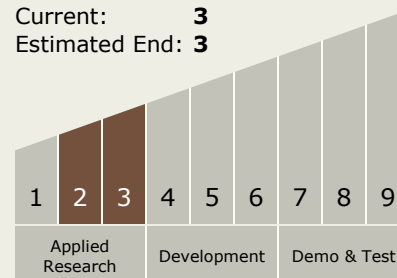
Paulo Lozano

### Co-Investigator:

Louis Perna

## Technology Maturity (TRL)

Start: 2  
Current: 3  
Estimated End: 3



## Technology Areas

### Primary:

- TX01 Propulsion Systems
  - TX01.2 Electric Space Propulsion
    - TX01.2.2 Electrostatic